REVIEW

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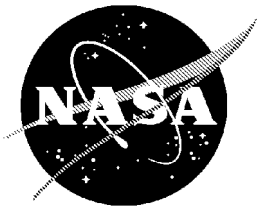
Earth Science Data and Information System (ESDIS) Level 1 Product Generation System (LPGS) Interface Definitions Document (IDD)

August 1997



National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

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August 1997

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Prepared by:

O. Mechaly Date
Software Engineer, CSC

Reviewed by:

D. Derrick Date
LPGS Technical Manager, CSC

D. Badolato Date
LPGS Software Development Manager,
GSFC, Code 551

J. Pizzola Date
LPGS Project Manager, CSC

Quality Assured by:

S. Whisonant Date
Quality Assurance Officer,
Landsat 7 Project, CSC

Approved by:

M. Samii Date
Landsat 7 Technical Area Manager, CSC

J. Henegar Date
LPGS Project Manager,
GSFC, Code 514

Goddard Space Flight Center
Greenbelt, Maryland

Preface

This document provides a current understanding of the definition of the interfaces between the Level 1 Product Generation System (LPGS) subsystems.

Abstract

This interface definitions document (IDD) presents the functional, performance, operational, and implementation requirements for the interfaces between the Level 1 Product Generation System (LPGS) subsystems.

Keywords*: interface definitions document (IDD), Level 1 Product Generation System (LPGS)*

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Section 1. Introduction

1.1 Purpose

This interface definitions document (IDD) presents the interface requirements between the Level 1 Product Generation System (LPGS) subsystems located at the Earth Resources Observation System (EROS) Data Center (EDC).

1.2 Scope

This document provides the functional, performance, operational, and implementation requirements for the LPGS subsystem interfaces. It is intended for all parties requiring such information, including system engineers and system designers responsible for implementing the interfaces and system maintenance personnel responsible for maintaining the interfaces.

1.3 Organization

This document is organized into four sections. Section 1 provides an introduction. Section 2 discusses all LPGS subsystem communications, which includes data communicated between the Process Control Subsystem (PCS), Data Management Subsystem (DMS), Radiometric Processing Subsystem (RPS), Geometric Processing Subsystem (GPS), Anomaly Analysis Subsystem (AAS), and Quality Assessment Subsystem (QAS). Section 3 explains the RPS and GPS interface. Section 4 addresses user interface (UI) communications.

1.4 Applicable Documents

The following documents contain additional details regarding the LPGS, the Landsat 7 System, and external systems.

1.4.1 Specification Documents

The following documents provide the basis for developing the LPGS subsystem interface definitions presented in this document:

1. National Aeronautics and Space Administration (NASA)/Goddard Space Flight Center (GSFC), 510-3SUG/0297 (CSC 10037610), *Earth Science Data and Information System (ESDIS) Level 1 Product Generation System (LPGS) User's Guide*, Draft, August 1997

2. --, 510-4DDS/0197 (CSC 10038085), *Earth Science Data and Information System (ESDIS) Level 1 Product Generation System (LPGS) Detailed Design Specification*, Review, August 1997

3. --, 510-4PDS/1097, *Level 1 Product Generation System (LPGS) Preliminary Design Specification*, April 1997

4. --, 510-3OCD/0296 (CSC 10034093), *Level 1 Product Generation System (LPGS) Operations Concept*, February 1997

5. --, 510-4SDS/0196 (CSC 10034686), *Earth Science Data and Information System (ESDIS) Level 1 Product Generation System (LPGS) System Design Specification*, March 1997

6. --, 510-FPD/0196, *Level 1 Product Generation System (LPGS) Functional and Performance Requirements Specification*, February 1997

7. --, 430-11-06-007-0, *Landsat 7 Zero-R Distribution Product Data Format Control Book, HDF Version*, May 1997

8. --, 510-3DFC/0197, *Level 1 Product Generation System (LPGS) Output Files, Data Format Control Book*, April 1997

9. --, 430-L-0002-H, *Landsat 7 System Specification*, August 1994

10. Hughes Information Technology Systems, 209-CD-013-003, *Interface Control Document Between EOSDIS Core System (ECS) and the Landsat 7 System*, March 1996

11. --, 209-CD-029-001, *Interface Control Document Between the EOSDIS Core System (ECS) and the Level 1 Product Generation System*, Draft, June 1997

12. *Exploring Oracle DBMS*, "Parallel Processing Toolbox, Part 1," Vol. 2, No. 1, January 1997

13. "Concepts for ECS/LPGS I/F," A. Bernard, June 1997

1.4.2 Reference Documents

The following documents contain additional background information related to the Landsat 7 mission:

1. NASA/GSFC, *Landsat 7 Level 1 Requirements* (Draft), August 1994

2. AlliedSignal Technical Services Corporation (ATSC), *Landsat 7 Detailed Mission Requirements*, March 1996

3. NASA/GSFC, 430-11-06-003-0, *Landsat 7 System and Operations Concept*, October 1994

4. Martin Marietta Astro Space, CDRL No. A104, *Space Segment Calibration Plan*, August 1994

5. --, 23007702, *Landsat 7 System Data Format Control Book (DFCB) Volume 4—Wideband Data, Revision F*, May 1997

6. --, CDRL #A058, 23007610A, *Landsat-7 Program Coordinate System Standard, Revision B*, December 1994

7. United States Geological Survey (USGS)/National Oceanic and Atmospheric Administration (NOAA), *Index to Landsat 7 Worldwide Reference System (WRS)*, 1982

Section 2. All LPGS Subsystem Communications

The interprocess communication (IPC) between the LPGS subsystems occurs through the LPGS database, the Oracle Database Management System (DBMS) pipes, or script parameters. Which of these methods is used depends on the needs of the subsystem or task.

The LPGS subsystems and their tasks are shown in Table 2-1 to facilitate the discussion of the LPGS IPC.

Table 2-1. LPGS Subsystems and Their Tasks

Subsystem	Tasks
Anomaly Analysis Subsystem (AAS)	None
Data Management Subsystem (DMS)	IF With ECS (DIE)
	Xmit L1 Product (DXL)
	Format L1 Product (DFL)
	Ingest L0R Product (DIL)
	Resource Manager (DRM)
	Generate Reports (DGR)
	Process L0R Product (DPL)
Geometric Processing Subsystem (GPS)	None
Process Control Subsystem (PCS)	Schedule Work Orders (PWS)
	Generate Work Orders (PWG)
	Control Work Order Execution (PWC)
	Process System Initialization/Termination (PSI)
Quality Assessment Subsystem (QAS)	Perform L1R Quality Assessment (Q1R)
	Perform L1G Quality Assessment (Q1G)
	Perform User Request (QUI)
Radiometric Processing Subsystem (RPS)	None
User Interface (UI)	None

Data communicated through the LPGS database are updated by one subsystem and read by another subsystem, either as part of processing or based on a timer. For example, before a script to begin radiometric processing is initiated, PCS checks the database to make sure that the product request has not been canceled. An example of a timer polling the database for a value is the DXL task looking for a product_requests table state value of “shippable.” When DXL finds this value, it knows that the Level 1 (L1) products associated with this product request are ready for transmission to the Earth Observing System Data and Information System (EOSDIS) Core System (ECS).

The various LPGS subsystems use two major tables to communicate with each other, the product_requests table and the work_orders table. The product_requests table has three fields

that are used by more than one subsystem: state, cancellation_status, and delete_flag. The work_orders table has one field that is shared by several subsystems, state. Table 2-2 indicates how these fields are initialized and then updated and who reads them (i.e., which tasks act on the specific field value).

Oracle DBMS pipes are used to send a specific message between the UI and a task. This is especially valuable in instances where timeliness is an issue. The Delete Product Request Files and Directories interface between the UI and DMS uses a pipe (see Section 4). The Delete Product Request Files and Directories interface is designed to allow the operator to request that certain files and directories be deleted immediately due to some disk problem. The pipe allows the message to get to DMS immediately.

UNIX script parameters are passed to scripts for script execution via an Object Descriptive Language (ODL) file. The ODL filename is passed to the script as an input parameter, and the script accesses the file and reads the specific parameters needed for processing. The processing status is then returned to the caller as an exit status.

2.1 PCS and DMS

2.1.1 ECS_Prod_Req

2.1.1.1 Description

The ECS_Prod_Req interface contains the product request that was provided by the ECS. DIE places the request in the product_requests table.

2.1.1.2 Format/Size

The format and size of the ECS_Prod_Req interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	whole table row	state = pending	~450

2.1.1.3 IPC Mechanism

DIE writes the product request into the product_requests table. DIL reads the table, looking for a status of “pending” as an indicator that it can get Level 0 (L0) data from the ECS for the product request.

Write	Read
DIE	DIL

Table 2-2. Database Fields Used for Interfacing Information (1 of 2)

Table	Field	Value	Set By	Read By	Interface Name
product_requests	state	pending	DIE UI	DIL	ECS_Prod_Req Generate Product Request
		L0r requested	DIL	DIL PWS	L0R_Ingest_Info
		L0r ready	DIL	PWS	L0R_Data_Avail
		process	PWS	PWS	
		shippable	PWC	DXL	L1_Prod_Xfer_Req
		pdr generated	DXL	DXL	L1_Xmit_Info
		xferred	DXL		L1_Xmit_Info
		failed	AAS/UI		AAS_Prod_Info
		cancel	PWS PWC DIL		Cancel_Info
	cancellation_ status	no	DIE		
		pending	UI	DIL PWS PWC	Cancel_Info
		done	PWS PWC DIL		Cancel_Info
	delete_flag	no	DIE		
		deletable	PWS PWC UI DXL DIL	DRM	Delete_Info
		deleted	DRM		Delete_Info
work_orders	state	aas	AAS/UI	AAS	Generate Work Order
		aas	AAS	AAS	AAS_Run_Request
		pending	PWG AAS/UI	PWS	(set by PWG when work order is created) Activate Work Order
		executing	PWS		
		resumable	UI AAS QUI	PWS	L1_Product_Approval Resume Work Order Approve/Disapprove Intermediate Visual Image Approve L1 Product for Distribution to ECS
		failed	AAS/UI		Fail Product

Table 2-2. Database Fields Used for Interfacing Information (2 of 2)

Table	Field	Value	Set By	Read By	Interface Name
		anomaly	PWC QUI	AAS	Anomaly_Req Approve/Disapprove Intermediate Visual Image Approve L1 Product for Distribution to ECS
		anomaly received	AAS	AAS	Anomaly Received
		canceled	PWS PWC AAS/UI DIL	PWC	Delete_Info Cancel Work Order
		ready to ship	PWC		(based on exit status from L1_Format_ Status)

2.1.1.4 Frequency

This interface is invoked each time the ECS sends a new product request to the LPGS.

2.1.2 L0R_Data_Avail

2.1.2.1 Description

The L0R_Data_Avail interface notifies PWS that L0R data are available for a product request and, therefore, PCS can start its processing of the product request (i.e., generate a work order).

2.1.2.2 Format/Size

The format and size of the L0R_Data_Avail interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	state	value = L0 ready	2

2.1.2.3 IPC Mechanism

DIL updates the product_requests table, and PWS reads the table.

Write	Read
DIL	PWS

2.1.2.4 Frequency

This interface is invoked each time DIL receives L0R data and completes placing the data in the appropriate directories.

2.1.3 L0R_Stats_Req

2.1.3.1 Description

The L0R_Stats_Req interface notifies DPL that a Level 0 radiometrically corrected (L0R) product that has been ingested into the LPGS requires analysis before its use in a work order. The L0R product must be validated and consensus payload correction data (PCD) and consensus mirror scan correction data (MSCD) files must be generated.

2.1.3.2 Format/Size

The format and size of the L0R_Stats_Req interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully identifies location of ODL file	80

The format of the L0R_Stats_Req ODL file is as follows:

Parameter	Type	Comment
product_request_id	Character	Identifies product request that DPL must process

2.1.3.3 IPC Mechanism

The parameters are packaged in an ODL file. The ODL filename is passed to DPL from PCS as a calling parameter through the script that invokes this process. DPL uses commercial off-the-shelf (COTS) software to read the ODL file.

2.1.3.4 Frequency

Before an L0R product is used in a work order, PCS activates this interface to command DPL to perform data validation and to create consensus PCD and MSCD files.

2.1.4 L0R_Stats_Status

2.1.4.1 Description

The L0R_Stats_Status interface provides the processing status from DPL to PCS indicating whether the results of the L0R product validation were successful and whether the consensus PCD and MSCD files have been generated successfully.

2.1.4.2 Format/Size

The format and size of the L0R_Stats_Status interface are as follows:

Parameter	Type	Comment	Size (Bytes)
exit status	Integer	Indicates success or failure of process	2

2.1.4.3 IPC Mechanism

The L0R product preprocessing performed by DPL is started as a script by PCS. When this process exits, it returns an exit status to PCS. The contents of the L0R_Stats_Status interface are returned in the DPL process exit status.

2.1.4.4 Frequency

The contents of this interface are returned from DPL each time preprocessing of an L0R product has been completed.

2.1.5 L0R_Ingest_Info

2.1.5.1 Description

The L0R_Ingest_Info interface provides the status information DIL writes to the product_requests table. The data include the intermediate states of the ingest process via the protocol_status and the final state when the L0R data are available for processing (i.e., L0R ready).

2.1.5.2 Format/Size

The format and size of the L0R_Ingest_Info interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	state	value = L0R requested = L0R ready	2
	protocol_status	Values used internally by DIL to determine what part of protocol has been completed	2

2.1.5.3 IPC Mechanism

DIL updates the state and the protocol_status parameters in the product_requests table. DIL uses the protocol_status internally; PWS acts on the L0R ready state, not the L0R requested state. However, a subset of the L0R_Ingest_Info, L0R_Data_Avail, is read by PWC.

Write	Read
DIL	PWS, DIL

2.1.5.4 Frequency

The product_requests table is updated by DIL each time the protocol_status of the ingest changes, when the L0R product is requested, and when the L0R product is available for processing.

2.1.6 L1_Format_Req

2.1.6.1 Description

The L1_Format_Req interface requests that DFL format an L1 product prior to its transfer to the ECS. DFL packages the L1 product and moves it to a staging directory in preparation for delivery to the ECS.

2.1.6.2 Format/Size

The format and size of the L1_Format_Req interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The format of the L1_Format_Req ODL file is as follows:

Parameter	Type	Comment
product_request_id	Character	Identifies product request image that needs to be formatted

2.1.6.3 IPC Mechanism

Parameters required for formatting the L1 product are placed in an ODL file by PCS. When PCS starts the DFL script, it passes the ODL filename as an input parameter to the script. COTS software invoked by DFL reads the parameters.

2.1.6.4 Frequency

Before delivery of an L1 product, PCS activates this interface to command DFL to format both image and nonimage data, package the L1 product, and place the product in the output directory.

2.1.7 L1_Format_Status

2.1.7.1 Description

The L1_Format_Status interface provides the processing status from DFL to PCS regarding the formatting of the L1 product and its movement to a delivery directory.

2.1.7.2 Format/Size

The format and size of the L1_Format_Status interface are as follows:

Parameter	Type	Comment	Size (Bytes)
exit status	Integer	Indicates success or failure of process	2

2.1.7.3 IPC Mechanism

The L1 formatting performed by DFL is started as a script by PCS. When the DFL child process exits, it returns an exit status to PCS. The contents of the L1_Format_Status interface are returned in the DFL process exit status. If this exit status indicates success, PCS updates the work_orders state to “ready to ship.”

2.1.7.4 Frequency

The contents of the L1_Format_Status interface are returned from DFL each time an L1 product has been formatted and staged.

2.1.8 L1_Prod_Xfer_Req

2.1.8.1 Description

The L1_Prod_Xfer_Req interface notifies DXL that an L1 product is ready to be transmitted to the ECS.

2.1.8.2 Format/Size

The format and size of the L1_Prod_Xfer_Req interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	state	value = shippable	2

2.1.8.3 IPC Mechanism

PWC updates the database with the data. DXL periodically checks the product_requests state in the database.

Write	Read
PWC	DXL

2.1.8.4 Frequency

PWC sets the state to "shippable" when the work order processing completes successfully. DXL periodically polls the database for L1 products ready for transmission to the ECS. DXL initiates the transfer of the product when an L1 product state value indicates that the product is shippable.

2.1.9 Delete_Info (DXL to DRM)

2.1.9.1 Description

The Delete_Info interface is used in nominal processing by DXL to notify DRM that delivery of an L1 product to the ECS has completed successfully and, therefore, the files associated with this product request can be deleted. DRM reads the delete_flag from the database and proceeds to delete the designated product request data.

2.1.9.2 Format/Size

The format and size of the Delete_Info (DXL to DRM) interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	delete_flag	value = deletable	1

2.1.9.3 IPC Mechanism

DXL updates the delete_flag in the database. DRM periodically checks the value of the delete_flag in the database.

Write	Read
DXL	DRM

2.1.9.4 Frequency

The delete_flag in the product_requests table is set by DXL for each L1 product after it has been sent successfully to the ECS. DRM periodically polls the database for the delete_flag to determine which products can be deleted. After each successful deletion of a product request, DRM updates the product_requests table's delete_flag to indicate the products were deleted.

2.1.10 Delete_Info (DIL, PWC, PWS to DRM)

2.1.10.1 Description

The Delete_Info interface is used by DIL, PWC, and PWS to inform DRM that product request files can be deleted because the product request was canceled.

2.1.10.2 Format/Size

The format and size of the Delete_Info (DIL, PWC, PWS to DRM) interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	delete_flag	value = deletable	1
work_orders	state	value = canceled	2

2.1.10.3 IPC Mechanism

DIL, PWC, and PWS write the contents of the Delete_Info interface (delete_flag and state) to the database. DRM periodically checks the value of the delete_flag in the database. When DRM finds the delete_flag set to “deletable,” it deletes the files and directories, then updates the delete_flag to “deleted.”

When PWS checks for work orders to process, it bypasses work orders with a state of canceled.

Write	Read
DIL, PWC, PWS	DRM

2.1.10.4 Frequency

The delete_flag in the product_requests table and state in the work_orders table are updated by DIL, PWS, or PWC at various points depending on where in the process the cancellation is received. DIL sets these flags whenever it detects that a product request has been canceled as part of ingest processing. PWS sets these flags when it detects that the product request has been canceled before generating or scheduling the work order for this product request. PWC sets these flags when it detects that the product request has been canceled before starting the next work order script for this product request.

DRM periodically polls the database for the delete_flag to determine which products can be deleted. After each successful deletion of a product request, DRM updates the product_requests table’s delete_flag to indicate the products were deleted.

2.2 DMS Internal

2.2.1 L1_Xmit_Info

2.2.1.1 Description

The L1_Xmit_Info interface information is used to keep track of the L1 product's shipping state. The product_requests table is updated when the product delivery record (PDR) has been generated for a product request that has L1 products and then again when the L1 products have been transferred successfully to the ECS.

2.2.1.2 Format/Size

The format and size of the L1_Xmit_Info interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	state	value = pdr generated = xferred	2

2.2.1.3 IPC Mechanism

DXL updates the state at the intermediate point and then again when the product has been shipped. The final state of "xferred" is subsequently used for reporting purposes.

Write	Read
DXL	DXL

2.2.1.4 Frequency

This interface is invoked each time DXL generates a PDR and each time DXL completes the shipment of L1 products.

2.3 AAS and PCS

2.3.1 L1_Product_Approval

2.3.1.1 Description

The L1_Product_Approval interface informs PCS that AAS was able to process the anomaly product request successfully. Statistics will now need to be updated by PCS.

2.3.1.2 Format/Size

The format and size of the L1_Product_Approval interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = resumable	2

2.3.1.3 IPC Mechanism

AAS updates the work_orders table. PCS reads the work_orders table, looking for a status of "resumable," and spawns a task to determine, in this case, that there are no more scripts to run for this work order. PCS will therefore update only states and statistics.

Write	Read
AAS	PWS

2.3.1.4 Frequency

The contents of this interface are updated by AAS each time it is able to process an anomaly successfully.

2.3.2 Anomaly_Req

2.3.2.1 Description

The Anomaly_Req interface informs AAS that a new anomaly exists in the system. The anomaly is detected by QAS, which informs PCS by an exit status to a script. PCS then updates the work_orders table to indicate the existence of the new anomaly.

2.3.2.2 Format/Size

The format and size of the Anomaly_Req interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = anomaly	2

2.3.2.3 IPC Mechanism

PCS updates the work_orders table. AAS reads the work_orders table looking for a status of "anomaly."

Write	Read
PWC	AAS

2.3.2.4 Frequency

The contents of this interface are updated by PCS each time QAS returns an exit status of "anomaly" from either radiometric or geometric quality checking.

2.4 AAS Internal

2.4.1 Anomaly Received

2.4.1.1 Description

The Anomaly Received interface updates state in the work_orders table to "anomaly received" so that AAS does not pick up an anomaly after it has been added to the anomalies table.

2.4.1.2 Format/Size

The format and size of the Anomaly Received interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = anomaly received	2

2.4.1.3 IPC Mechanism

AAS updates the state in the work-orders table from "anomaly" to "anomaly received" after it locates the work order with the anomaly.

Write	Read
AAS	AAS

2.4.1.4 Frequency

The contents of this interface are updated by AAS each time it finds a new anomaly in the work_orders table.

2.4.2 AAS_Run_Request

2.4.2.1 Description

The AAS_Run_Request interface updates the database with one of three types of work orders: diagnostic, benchmark, or reprocessing.

2.4.2.2 Format/Size

The format and size of the AAS_Run_Request interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	whole work order table row	state = aas	~344

2.4.2.3 IPC Mechanism

AAS updates the database with the new work order. When the analyst is ready to run the new work order, the Activate Work Order interface is used (see Section 4) to change the state of the work order to "pending." This will cause PCS to process the work order.

Write	Read
AAS	AAS

2.4.2.4 Frequency

The contents of this interface are updated by AAS each time a new diagnostic, benchmark, or reprocessing work order needs to be executed.

2.5 QAS and PCS

2.5.1 Q1R_Proc_Req

2.5.1.1 Description

The Q1R_Proc_Req interface allows PCS to request Q1R to perform the automated image quality assessment on the L1 radiometrically corrected (L1R) image. PCS invokes Q1R and passes the ODL filename as an input parameter to the UNIX script. The ODL file contains values required to perform the automated image quality assessment.

2.5.1.2 Format/Size

The format and size of the Q1R_Proc_Req interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The Q1R_Proc_Req ODL file contains only the location of the LMASK for this image.

2.5.1.3 IPC Mechanism

The automated image quality assessment of the L1R image is started as a script by PCS. The script receives an ODL filename as an input parameter. Q1R processing accesses the parameters in the file.

2.5.1.4 Frequency

The contents of this interface are sent to Q1R from PCS for every work order processed.

2.5.2 Q1R_Proc_Status

2.5.2.1 Description

The Q1R_Proc_Status interface provides the processing status to PCS regarding the image quality assessment of the L1R image.

2.5.2.2 Format/Size

The format and size of the Q1R_Proc_Status interface are as follows:

Parameter	Type	Comment	Size (Bytes)
exit status	Integer	Indicates success or failure of the process	2

2.5.2.3 IPC Mechanism

The automated image quality assessment of the L1R image is started as a script by PCS. When the Q1R child process exits, it returns an exit status to PCS.

2.5.2.4 Frequency

The contents of this interface are sent to PCS from Q1R on completion of L1 automated image quality assessment each time a work order is processed.

2.5.3 Q1G_Proc_Req

2.5.3.1 Description

The Q1G_Proc_Req interface allows PCS to request Q1G to perform the automated image quality assessment on the L1 geometrically corrected (L1G) image. PCS invokes Q1G and passes the ODL filename as an input paramter to the UNIX script. The ODL file contains values required to perform the automated image quality assessment.

2.5.3.2 Format/Size

The format and size of the Q1G_Proc_Req interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The contents of the Q1G_Proc_Req ODL file is as follows:

Parameter	Type
num_bad_eph	
num_bad_semi	
num_bad_incl	
num_bad_ang	
ave_semi_major	
std_semi_major	
ave_inclination	
std_inclination	
ave_ang_momentum	
std_ang_momentum	
num_bad_epa1	
num_bad_epa2	
num_bad_epa3	
num_bad_epa4	
ave_delta_epa1	
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std_delta_epa4	
num_bad_groll	
num_bad_gpitch	
num_bad_gyaw	
ave_delta_groll	
std_delta_groll	
ave_delta_gpitch	
std_delta_gpitch	
ave_delta_gyaw	
std_delta_gyaw	
num_bad_gdroll	

Parameter	Type
num_bad_gdpitch	
num_bad_gdyaw	
det_star_sight	
num_bad_aroll	
num_bad_apitch	
num_bad_ayaw	
ave_delta_aroll	
std_delta_aroll	
ave_delta_apitch	
std_delta_apitch	
ave_delta_ayaw	
std_delta_ayaw	
bad_time_coeffs	
bad_on_time	
dif_on_to_start	
num_bad_serr	
ave_for_fhserr	
ave_rev_fherr	
ave_for_shserr	
ave_rev_sherr	
std_for_fhserr	
std_rev_fherr	
std_for_shserr	
std_rev_sherr	
num_bad_dir	
num_bad_time	
ave_dstart_time	
std_dstart_time	
numb_bad_length_counted	
num_bad_length_calculated	
ave_line_length	
std_line_length	

2.5.3.3 IPC Mechanism

The automated image quality assessment of the L1G image is started as a script by PCS. The script receives an ODL filename as an input parameter. Q1G processing accesses the parameters in the file.

2.5.3.4 Frequency

The contents of this interface are sent to Q1G from PCS for every work order processed.

2.5.4 Q1G_Proc_Status

2.5.4.1 Description

The Q1G_Proc_Status interface provides the processing status to PCS regarding the image quality assessment of the L1 geometrically corrected image.

2.5.4.2 Format/Size

The format and size of the Q1G_Proc_Status interface are as follows:

Parameter	Type	Comment	Size (Bytes)
exit status	Integer	Indicates success or failure of process	2

2.5.4.3 IPC Mechanism

The automated quality image assessment of the L1G image is started as a script by PCS. When the Q1G child process exits, it returns an exit status to PCS.

2.5.4.4 Frequency

The contents of this interface are sent to PCS from Q1G on completion of L1 automated image quality assessment each time a work order is processed.

2.6 PCS and RPS

The RPS provides radiometric correction of the L0R image. An RPS script starts each RPS program. PCS starts all RPS scripts as part of work order execution. As each RPS script terminates, PCS retrieves the exit status and reports it to the LPGS database.

2.6.1 Proc_Parms (Radiometric)

2.6.1.1 Description

The Proc_Parms interface contains processing parameters for radiometric characterization and generation of the L1R image. PCS retrieves these parameter values from the LPGS database and builds an ODL parameter file. PCS passes the ODL parameter filename to RPS during the fork/exec of the RPS script.

2.6.1.2 Format/Size

The format and size of the Proc_Parms (radiometric) interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The format of the Proc_Parms (radiometric) ODL file is as follows:

Parameter	Type	Comment
universal_reference	8 char	
band_list	9 integers	Bands to be processed (1, 2, 3, 4, 5, 6L, 6H, 7, 8)
scene_type	Integer	Used by 1R programs to determine which algorithms to invoke: 0 = day 1 = night
cal_parm_sel	Integer	Specifies whether prelaunch, postlaunch, or current launch calibration parameter file (CPF) parameter values are to be used: 0 = current 1 = prelaunch 2 = postlaunch
gain_source	Integer	Identifies the source of the gains to be applied for the product being processed: 0 = IC, for gains derived from processing this product's internal calibrator (IC) data 1 = CPF, for gains extracted from a CPF
apply_relgains	Integer	Specifies whether relative gains are to be applied: 0 = no 1 = yes
apply_tempcorr	Integer	Specifies whether temperature corrections are to be applied: 0 = no 1 = yes
corr_inopdet	Integer	Specifies whether inoperable detector correction should be performed: 0 = none 1 = interpolate 2 = substitute
fill_inopdet	Integer	Specifies fill value to be substituted for inoperable detectors
corr_major_frame	Integer	Specifies whether dropped major frames (entire scan) should be corrected: 0 = none 1 = interpolate 2 = substitute

Parameter	Type	Comment
corr_minor_frame	Integer	Specifies whether dropped minor frames should be corrected: 0 = none 1 = interpolate 2 = substitute
fill_value	Integer	Specifies fill value to be substituted for dropped major or minor frames
corr_banding	Integer	Specifies whether banding corrections should be applied: 0 = no 1 = yes
corr_striping	Integer	Specifies whether striping corrections should be applied: 0 = no 1 = yes

2.6.1.3 IPC Mechanism

RPS parameters are passed via an ODL file. PCS builds the ODL file and passes the ODL filename to RPS as a command line argument. RPS reads the ODL file via COTS software.

2.6.1.4 Frequency

The contents of this interface are sent to RPS from PCS each time a radiometric script is invoked.

2.6.2 Proc_Status (Radiometric)

2.6.2.1 Description

PCS is the parent of all RPS scripts. When the RPS script exits, UNIX returns the exit status to PCS.

2.6.2.2 Format/Size

The format and size of the Proc_Status (radiometric) interface are as follows:

Parameter	Type	Size (Bytes)
exit status	Integer	2

2.6.2.3 IPC Mechanism

The radiometric processing performed by RPS is started as a script by PCS. When the RPS child process exits, UNIX returns the process exit status to PCS. The Proc_Status is returned in the process exit status.

2.6.2.4 Frequency

The contents of this interface are sent to PCS from RPS each time a radiometric script is completed.

2.7 PCS and GPS

The GPS provides geometric correction of the L0R image. A GPS script starts each GPS program. PCS starts all GPS scripts as part of work order execution. As each GPS script terminates, PCS retrieves the exit status and reports it to the LPGS database.

2.7.1 Proc_Parms (Geometric)

2.7.1.1 Description

The Proc_Parms interface contains processing parameters to perform L1G processing and geometric characterization. PCS retrieves these parameter values from the LPGS database and builds an ODL parameter file. PCS passes the ODL parameter filename to GPS during the fork/exec of the GPS script.

2.7.1.2 Format/Size

The format and size of the Proc_Parms (geometric) interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The format of the Proc_Parms (geometric) ODL file is as follows:

Parameter	Type	Comment
Global		
L0R_HDFNAME	256 char	Input L0R product path
L0R_ID	8 char	Unique L0R identifier used for trending
WO_DIRECTORY	256 char	Work order directory path
CAL_PARM_FILE	256 char	LPGS leaves this parameter out and uses the L0R CPF
FDF_NAME	256 char	LPGS leaves this out and uses PCD ephemeris
SCRIPT_NAME	32 char	Script name used to tag status/error reporting and to identify the object/group name in the ODL parameter file passed to the application
TMINIT		
META_OPT	1 long	Option to validate the metadata: 0 = off (default) 1 = on
TMODEL_FILE_NAME	256 char	Output ETM+ model filename; default is “etmodel.stm”

Parameter	Type	Comment
TMGRID		
L1R_IMAGE	256char	Input L0R or L1R image for which grid is to be generated
TMODEL_FILE_NAME	256 char	Input ETM+ model file; default is “etmodel.stm”
GRID_FILE_NAME	256 char	Output grid filename; default is “etmgrid.sgrd”
PROJ_CODE	1 long	Projection code: 1 = Universal Transverse Mercator (UTM) 4 = Lambert Conformal Conic (LCC) 6 = Polar Stereographic 7 = Polyconic 9 = Transverse Mercator 20 = Oblique Mercator 22 = Space Oblique Mercator (SOM)
UTM_ZONE	1 long	UTM zone code: 1 to 60 = northern hemisphere -1 to -60 = southern hemisphere
PROJ_PARMS	15 double	Projection definition information. Content varies by projection (not used for UTM and SOM, for which the projection is completely defined by UTM_Zone and PATH_WRS, respectively)
PROJ_UNITS	12 char	Units of the projection distances (meters, feet, seconds, degrees, radians)
PIXEL_SIZE	3 double	Output pixel size: one value for bands 1 - 5 and 7, one value for band 6, and one value for band 8
BAND_NUMS	9 long	Band numbers to process
FRAME_TYPE	1 long	Framing option: 1 = User specifies UL and LR latitude/longitude coordinates (FRAME_COORDS[1]) 2 = User specifies LR output projection coordinates (FRAME_COORDS[2]). The user also specifies another point in output projection space (FRAME_COORDS[1]), along with its corresponding line/sample in image space (LSCOORDS) 3 = User specifies UL output projection coordinate (FRAME_COORDS[1]) and the number of lines (NLINES) and samples (NSAMPS) in output space 4 = Min-box framing (minimum bounding rectangle) 5 = Path-oriented (standard) framing (specify PATH_WRS and ROW_WRS parameters)
FRAME_COORDS	2x2 double	Frame coordinates that define the output space. Depends on value of FRAME_TYPE parameter (either UL and LR corners, reference point and LR corner, or UL corner)
COORD_UNITS	12 char	Units of FRAME_COORDS (degrees, seconds, DMS, projection)
LSCOORDS	2 double	Line/sample coordinates (used when FRAME_TYPE = 2)

Parameter	Type	Comment
NLINES	3 long	Number of lines in output space (used when FRAME_TYPE = 3); one value for bands 1 - 5 and 7, one value for band 6, and one value for band 8
NSAMPS	3 long	Number of samples in output space (used when FRAME_TYPE = 3): one value for bands 1 - 5 and 7, one value for band 6, and one value for band 8
PATH_WRS	1 long	WRS path number. Used for constructing standard path-oriented frame when FRAME_TYPE = 5. Also used when PROJ_CODE = 22 (SOM)
ROW_WRS	1 double	WRS row number (may be fractional). Used for constructing standard path-oriented frame when FRAME_TYPE = 5
TMRESAMPLE		
L1R_IMAGE	256 char	Input L1R or L0R image filename to be resampled
BANDS	9 long	Bands to process
L1G_IMAGE	256 char	Output image filename. This will be the output hierarchical data format (HDF) name. Band files will be created as associated external files
INPUT_GRID	256 char	Input grid filename. Default is “etmgrid.sgrd”
TERRAIN_FLAG	1 long	Flag to apply terrain correction: 0 = no (always) 1 = yes
IN_DEM_NAME	256 char	Input digital elevation model (DEM) image filename (co-registered) (if TERRAIN_FLAG = 1). Can set to null string or leave out
TERR_TBL_FLAG	1 ong	Flag to read or calculate table of terrain offsets (if TERRAIN_FLAG = 1): 0 = calculate 1 = read Can set to 0 or leave out
TERR_TBL_NAME	256 char	Name of optional input terrain table (elevation offsets file) (if TERR_TBL_FLAG = 1). Can set to null string or leave out
DELAY_FLAG	1 long	Flag to apply detector delays: 0 = off 1 = on (always)
ODTYPE	4 char	Output data type (BYTE, I*2, I*4, R*4). Always BYTE unless data type options are going to be provided to the user
EXT_FLAG	1 long	Flag to save the extended image: 0 = no (always) 1 = yes
OUT_EXT_NAME	256 char	Output extended image filename (optional). Can set to null string or leave out
WINDOW_FLAG	1 long	Output window option flag: 0 = no (always) 1 = yes
WINDOW	4 long	Output window (sl, ss, nl, ns). Always (0,0,0,0)

Parameter	Type	Comment
RESAMPLE	3 char	Resampling method: NN = nearest neighbor CC = cubic convolution MTF = modulation transfer function
MINMAX_OUTPUT_DN	2 float	Minimum and maximum output values (used to limit output range for nonbyte output)
PCCALPHA	1 float	Parametric cubic convolution alpha parameter; default is -0.5
BACKGRND	1 float	Gray level fill value outside input image
TREND_FILE	256 char	Scan gap statistics filename. This should be changed to a long flag used to switch trending on or off because this information is now written to the Oracle database via PutTrend. This should be null for LPGS

2.7.1.3 IPC Mechanism

GPS parameters are passed via an ODL file. PCS builds the ODL file and passes the ODL filename to GPS as a command line argument. GPS reads the ODL file via COTS software.

2.7.1.4 Frequency

The contents of this interface are sent to GPS from PCS each time a geometric script is invoked.

2.7.2 Proc_Status (Geometric)

2.7.2.1 Description

PCS is the parent of all GPS scripts. When the GPS script exits, UNIX returns the exit status to PCS.

2.7.2.2 Format/Size

The format and size of the Proc_Status (geometric) interface are as follows:

Parameter	Type	Size (Bytes)
exit status	Integer	2

2.7.2.3 IPC Mechanism

The geometric processing performed by GPS is started as a script by PCS. When the GPS child process exits, UNIX returns the process exit status to PCS. The Proc_Status is returned in the process exit status.

2.7.2.4 Frequency

The contents of this interface are sent to PCS from GPS each time a geometric script is completed.

Section 3. RPS and GPS

3.1 Lev_1R_Image

3.1.1 Description

RPS and GPS do not communicate with each other directly. RPS generates images and calibration data files, which GPS needs to access. For the two subsystems to be able to access these files, the name of an intermediate or final output file is derived from the L0R HDF header file. The "name root" is derived from the header filename by eliminating the leading path information and the trailing extension. Thus, a name root is in the form "L7xsssfnYYDOYHHuuv". The remainder of the name is constructed as follows:

NameRoot_xxx.yyy

where xxx = B10, B20, B30, B40, B50, B6L, B6H, B70, and B81 for image files

C10, C20, C30, C40, C50, C6L, C6H, C70, and C81 for CAL files

yyy = 0Rc for 0R corrected data (output from r0r)

1R for radiometrically (but not cosmetically) corrected data (output from r0c)

1Rc for radiometrically and cosmetically corrected data (output from r1r)

Both RPS and GPS use the above method to construct filenames based on the root name, L0R HDF header file data structure name. This name is referred to as universal_reference in the product_requests table.

3.1.2 Format/Size

The format and size of the Lev_1R_Image interface are as follows:

Parameter	Type	Comment	Size (Bytes)
odl_filename	Character	Fully qualifies location of ODL file	80

The format of the Lev_1R_Image ODL file is as follows:

Parameter	Type	Comment
universal_reference	Character	"name root" from which various file names can be generated

3.1.3 IPC Mechanism

The ODL filename contains the universal_reference identifier. GPS uses this identifier to generate the specific identifiers it needs.

3.1.4 Frequency

The image data can be generated during each work order execution. LPGS expects to process 25 work orders per day.

Section 4. User Interface

This section addresses the interface between the user and the LPGS subsystems. Most of the interfaces identified in this section are through the database or the Oracle pipes; however, some of the interfaces simply invoke COTS software. For example, when the user needs to access or respond to a trouble ticket, the REMEDY package will be invoked to process this interface.

Additional information regarding the user interface can be found in the *LPGS User's Guide* (Reference 1) as well as in the *LPGS Detailed Design Specification* (Reference 2).

4.1 UI and AAS

4.1.1 Generate Work Order

4.1.1.1 Description

This interface allows the AAS analyst to generate a work order to solve an anomaly. The work order can be a diagnostic, benchmark, or reprocess work order. The new work order will always be based on a previously existing work order.

4.1.1.2 Format/Size

The format and size of the Generate Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	whole table row	state = aas	~344

4.1.1.3 IPC Mechanism

A set of screens is provided from which the AAS analyst can select an existing work order, modify it, and save it as a new work order.

The AAS analyst populates the Generate Work Order screen with the desired values and parameters. When the submit key is pressed, the UI adds a new row to the work_orders table. PCS reads the work_orders table but does not actually schedule this work order until the analyst updates the state to "pending" via the Activate Work Order screen (see Section 4.1.4).

Write	Read
AAS/UI	AAS

4.1.1.4 Frequency

This interface is invoked each time the AAS analyst needs to generate a work order to analyze an anomaly.

4.1.2 Generate Product Request

4.1.2.1 Description

This interface allows the AAS analyst to generate a product request to process a trouble ticket. The original product request must already exist in the LPGS.

4.1.2.2 Format/Size

The format and size of the Generate Product Request interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	whole table row	state = pending	~450

4.1.2.3 IPC Mechanism

A set of screens is provided from which the AAS analyst can select an existing product request, modify it, and save it as a new product request. In this case, a whole table entry in the product_requests table would be generated by the UI. The status would be set to “pending.”

The UI enters the new entry in the table with status set to “pending.” DIL reads the product_requests table, looking for a status of “pending” as an indicator that it can get L0 data from the ECS.

Write	Read
UI	DIL

4.1.2.4 Frequency

This interface is invoked each time the AAS analyst needs to generate a product request to analyze a trouble ticket.

4.1.3 Cancel Work Order

4.1.3.1 Description

This interface allows the AAS analyst to cancel a work order that is being processed for analysis.

4.1.3.2 Format/Size

The format and size of the Cancel Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = canceled	2

4.1.3.3 IPC Mechanism

A screen is provided from which the AAS analyst can select an existing work order and cancel it. PWC reads the work_orders table.

Write	Read
AAS/UI	PWC

4.1.3.4 Frequency

This interface is invoked each time the AAS analyst needs to cancel a work order.

4.1.4 Activate Work Order

4.1.4.1 Description

This interface allows the AAS analyst to activate a work order that it has generated for analysis. When the work order was generated, it had a state of "aas" in the work_orders table. This interface changes state to "pending."

4.1.4.2 Format/Size

The format and size of the Activate Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = pending	2

4.1.4.3 IPC Mechanism

A screen is provided from which the AAS analyst can activate a work order from the "aas" state. PWS reads the work_orders table.

Write	Read
AAS/UI	PWS

4.1.4.4 Frequency

This interface is invoked each time the AAS analyst needs an AAS-created work order inserted into the processing queue.

4.1.5 Fail Product (AAS_Prod_Info)

4.1.5.1 Description

This interface allows the AAS analyst to show that a product request cannot be processed successfully.

4.1.5.2 Format/Size

The format and size of the Fail Product (AAS_Prod_Info) interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	state	value = failed	2
work_orders	state	value = failed	2

4.1.5.3 IPC Mechanism

A screen is provided from which the AAS analyst can select a product request and mark it as failed.

The ECS will not be notified of a product request that cannot be processed via the regular path (i.e., the DMS). Instead, it will be notified via a trouble ticket and e-mail or by phone communications.

Write	Read
AAS/UI	

4.1.5.4 Frequency

This interface is invoked each time the AAS analyst needs to show that a product request cannot be processed successfully.

4.1.6 Approve Distribution

4.1.6.1 Description

This interface allows the AAS analyst to approve the distribution of an L1 product that has been generated successfully during the analysis of a processing problem encountered by the LPGS.

4.1.6.2 Format/Size

The format and size of the Approve Distribution interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = resumable	2

4.1.6.3 IPC Mechanism

A screen is provided from which the AAS analyst approves an L1 product for distribution.

Write	Read
PWS	UI

4.1.6.4 Frequency

This interface is sent each time an AAS analyst needs to approve an L1 product for distribution to the ECS as a result of anomaly analysis.

4.2 UI and DMS

4.2.1 Acknowledge L0R Product Receipt (DMS_User_Input)

4.2.1.1 Description

This interface notifies DIL when the L0R product has been ingested manually. Upon notification, the DIL stages the product for processing.

4.2.1.2 Format/Size

The format and size of the Acknowledge L0R Product Receipt (DMS_User_Input) interface are as follows:

Table	Parameter	Comment	Size (Bytes)
message_type	Character	value = ingest	1
product_request_id	Character	Product request ID	20
file_location	Character	Location of the L0R product ingested by the operator	256

4.2.1.3 IPC Mechanism

This interface uses an Oracle pipe to transmit its contents to DIL.

4.2.1.4 Frequency

The contents of this interface are sent from the UI to DIL upon receipt of the operator request to acknowledge the manually ingested L0R product.

4.2.2 Delete Product Request Files and Directories

4.2.2.1 Description

This interface notifies DRM that the operator has requested the deletion of files and/or directories for a product request.

4.2.2.2 Format/Size

The format and size of the Delete Product Request Files and Directories interface are as follows:

Table	Parameter	Comment	Size (Bytes)
message_type	Character	value = delete file/directory	1
product_request_id	Character	Product request ID	20

4.2.2.3 IPC Mechanism

This interface uses an Oracle pipe to convey to DRM the command name and the associated product request ID.

4.2.2.4 Frequency

The contents of this interface are sent from the UI to DRM each time the operator invokes a request to delete files and directories of a product request.

4.2.3 Delete Characterization Results

4.2.3.1 Description

This interface notifies the DGR that the operator has requested the deletion of characterization results for a product request.

4.2.3.2 Format/Size

The format and size of the Delete Characterization Results interface are as follows:

Parameter	Type	Comment	Size (Bytes)
message_type	Character	value = delete trending	1
product_request_id	Character	Product request ID	20

4.2.3.3 IPC Mechanism

This interface uses Oracle pipes to transmit to DGR the command name and the associated product request ID.

4.2.3.4 Frequency

The contents of this interface are sent from the UI to DGR upon receipt of the operator request to delete the characterization results.

4.2.4 Cancel Product Request (L1_Prod_Cancel_Req, Cancel_Info)

4.2.4.1 Description

This interface notifies DIE that the operator has requested cancellation of the processing of a product request and identifies the product request that is to be canceled.

4.2.4.2 Format/Size

The format and size of the Cancel Product Request (L1_Prod_Cancel_Req, Cancel_Info) interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	cancellation_status	value = pending	1

4.2.4.3 IPC Mechanism

The UI updates the product_requests table's cancellation_status to "pending." DIL, PWS, and PWC read the status before continuing their normal processing. If DIL, PWS, or PWC finds a cancellation_status of "pending," it processes the cancellation and sets the cancellation_status to "done."

NOTE: This is DIE task code residing in the UI.

Write	Read
UI	DIL, PWS, PWC

4.2.4.4 Frequency

The contents of this interface are updated by UI each time the operator cancels a product request.

4.3 UI and PCS

4.3.1 Pause Work Order

4.3.1.1 Description

This interface allows the operator to pause a work order for any reason, including system maintenance.

4.3.1.2 Format/Size

The format and size of the Pause Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
wo_scripts	pause_flag	value = halted	1

4.3.1.3 IPC Mechanism

A screen is provided from which the operator can select an existing work order and pause it. The UI will update the wo_scripts (work order scripts) table. When PWC has completed running the current script, it will check the wo_scripts table to see if this script has a pause associated with it. If there is a pause associated with this script, the next script associated with this work order is not started and PWC terminates.

Write	Read
UI	PWC

4.3.1.4 Frequency

This interface is invoked each time the operator needs to pause a work order. However, a pause tied to a script does not take effect until the script ends.

4.3.2 Promote Work Order

4.3.2.1 Description

This interface allows the analyst to promote a work order. This situation would arise if the analyst finds that a benchmark or diagnostic work order needs to run as soon as possible to determine what problems the system is encountering.

4.3.2.2 Format/Size

The format and size of the Promote Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	promote_flag	value = true	1

4.3.2.3 IPC Mechanism

A screen is provided from which the analyst can select an existing work order and promote it.

Write	Read
UI	PCS

4.3.2.4 Frequency

This interface is invoked each time the analyst needs to promote a work order.

4.3.3 Promote Product Request

4.3.3.1 Description

This interface allows the operator to promote a product request.

4.3.3.2 Format/Size

The format and size of the Promote Product Request interface are as follows:

Table	Parameter	Comment	Size (Bytes)
product_requests	promote_flag	value = true	1

4.3.3.3 IPC Mechanism

A screen is provided from which the operator can select an existing product request and promote it.

Write	Read
UI	PCS

4.3.3.4 Frequency

This interface is invoked each time the operator needs to promote a product request based on an ECS request via e-mail or phone.

4.3.4 Resume Work Order

4.3.4.1 Description

This interface allows the operator to resume the processing of a work order after it has been paused.

4.3.4.2 Format/Size

The format and size of the Resume Work Order interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = resumable	2

4.3.4.3 IPC Mechanism

A screen will be provided from which the operator can select the work order and resume it.

Write	Read
UI	PWS

4.3.4.4 Frequency

This interface is invoked each time the operator needs to resume a work order.

4.3.5 Shutdown LPGS

4.3.5.1 Description

This interface allows the operator to shutdown the LPGS in either an immediate mode or a graceful mode.

4.3.5.2 Format/Size

The format and size of the Shutdown LPGS interface are as follows:

Table	Parameter	Comment	Size (Bytes)
ipc_directives	directive	value = graceful or immediate	1
	recipient	value = PSI	1

4.3.5.3 IPC Mechanism

A screen will be provided from which the operator can select how to shutdown the LPGS.

Write	Read
UI	PSI

4.3.5.4 Frequency

This interface is invoked each time the operator wants to shutdown the LPGS.

4.3.6 Restart LPGS

4.3.6.1 Description

This interface allows the operator to restart any one of the six background tasks. These include

- Work Order Scheduler (PWS)
- Interface with ECS (DIE)
- Ingest L0R Product (DIL)
- Generate Report (DGR)
- Transmit to ECS (DXL)
- DMS Resource Manager (DRM)

4.3.6.2 Format/Size

The format and size of the Restart LPGS interface are as follows:

Table	Parameter	Comment	Size (Bytes)
ipc_directives	directive	value = restart	2
	recipient	value = “task id”	80

4.3.6.3 IPC Mechanism

A screen will be provided from which the operator can select the LPGS task(s) to be restarted.

Write	Read
UI	PSI

4.3.6.4 Frequency

This interface is invoked each time the operator wants to restart LPGS tasks.

4.3.7 View System Messages and Halts

4.3.7.1 Description

This interface allows the operator to view system messages and halts.

4.3.7.2 Format/Size

The format and size of the View System Messages and Halts interface are as follows:

Table	Parameter	Comment	Size (Bytes)
events	whole table row		
	event_date		date
	message_id		3
	program_id		25
	work_order_id		8
	script_id		25
	event_comment		80

4.3.7.3 IPC Mechanism

A screen is provided where alerts, halts, and other system messages will be displayed. The screen is updated periodically based on a configurable parameter.

The operator selects the View Events Log menu item. The Events screen is opened and populated with the most recent events. Additional events can be viewed by scrolling down the screen.

Write	Read
All LPGS Tasks	UI

4.3.7.4 Frequency

This interface is invoked each time the operator opens the events screen. It is refreshed within a configurable parameter.

4.3.8 Start Background Tasks

4.3.8.1 Description

This interface allows the operator to start all the background tasks as a group.

4.3.8.2 Format/Size

The format and size of the Start Background Tasks interface are as follows:

Table	Parameter	Comment	Size (Bytes)
ipc_directives	directive	value = start all	80
	recipient	value = PSI	2

4.3.8.3 IPC Mechanism

A screen is provided where the operator can elect to start all the background tasks.

The operator opens the Start Background Tasks screen and elects to start all the tasks. The ipc_directives table is updated. This launches a script that starts PSI as a background task. PSI is then responsible for starting its children, the LPGS background tasks, and monitoring them.

Write	Read
UI	PSI

4.3.8.4 Frequency

This interface is invoked each time the operator elects to start all the background tasks. This should occur infrequently.

4.4 UI and QAS

4.4.1 Approve/Disapprove Intermediate Visual Image

4.4.1.1 Description

The Approve/Disapprove Intermediate Visual Image in QUI is a window button or function on the COTS Image Viewing software system. It is used by the user to approve or disapprove the L1 image during work order processing. Disapproving or rejecting the intermediate image results in an update to the work_orders table's state.

4.4.1.2 Format/Size

The format and size of the Approve/Disapprove Intermediate Visual Image interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = resumable or anomaly	2

4.4.1.3 IPC Mechanism

QAS updates state in the work_orders table via the approval/disapproval button. PCS and AAS both look at this state. PCS is looking for the "resumable" state, while AAS is looking for the "anomaly" state.

Read	Write
PWS, AAS	QUI

4.4.1.4 Frequency

This interface is invoked by QUI each time an intermediate image is rejected.

4.4.2 Approve L1 Product for Distribution to ECS

4.4.2.1 Description

The Approve L1 Product for Distribution to ECS in QUI is a window button on the COTS Image Viewing software system. It is an optional visual inspection by the user to approve or disapprove the L1 product prior to shipping. Disapproving or rejecting the product results in an update to the database work_orders table's state.

4.4.2.2 Format/Size

The format and size of the Approve L1 Product for Distribution to ECS interface are as follows:

Table	Parameter	Comment	Size (Bytes)
work_orders	state	value = resumable or anomaly	2

4.4.2.3 IPC Mechanism

Read	Write
PCS	QUI

4.4.2.4 Frequency

This interface is invoked by QUI each time an L1 product is approved or rejected.

4.4.3 View Image

4.4.3.1 Description

The View Image in QUI is a function of the COTS Image Viewing software system. Viewing the image is an LPGS analyst option. The package allows the analyst to select the image to be viewed and brings up the selected image.

4.4.3.2 Format/Size

The format and size of the View Image interface are as follows:

Parameter	Type	Comment	Size (Bytes)
image_id		Fully qualified location of image to be viewed	80

4.4.3.3 IPC Mechanism

The COTS package is provided the image identifier and then retrieves and displays the selected image.

4.4.3.4 Frequency

Image is viewed via the COTS package each time the analyst selects to view an image.

Abbreviations and Acronyms

AAS	Anomaly Analysis Subsystem
CC	cubic convolution
COTS	commercial off-the-shelf
CPF	calibration parameter file
DBMS	Database Management System
DEM	digital elevation model
DMS	Data Management Subsystem
ECS	EOSDIS Core System
EDC	EROS Data Center
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observation System
ESDIS	Earth Science Data and Information System
ETM+	Enhanced Thematic Mapper Plus
GPS	Geometric Processing Subsystem
HDF	Hierarchical Data Format
IC	internal calibrator
IDD	interface definitions document
IPC	interprocess communication
L0	Level 0
L0R	Level 0 radimetrically corrected
L1	Level 1
L1G	L1 geometrically corrected
L1R	L1 radiometrically corrected
LCC	Lambert Conformal Conic
LPGS	Level 1 Product Generation System
MSCD	mirror scan correction data
MTF	modulation transfer function

NN	nearest neighbor
ODL	Object Descriptive Language
PCD	payload correction data
PCS	Process Control Subsystem
PDR	product delivery record
QAS	Quality Assessment Subsystem
QC	quality control
RPS	Radiometric Processing Subsystem
SOM	Space Oblique Mercator
UI	user interface
UTM	Universal Transverse Mercator
WRS	Worldwide Reference System